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U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

Arizona State Office

1990

ARIZONA RIPARIAN-WETLAND AREA MANAGEMENT STRATEGY

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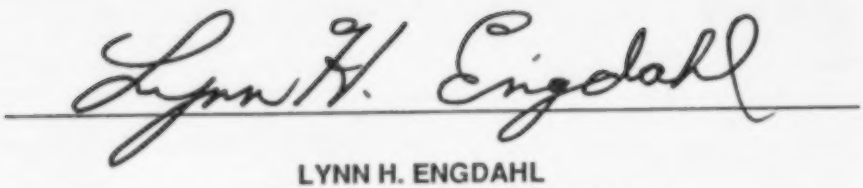
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ARIZONA STATE OFFICE

Prepared by Arizona Riparian-Wetland Area Management Strategy Task Force

Brent Jensen - Team Leader	Arizona Strip District
Barry Long	Phoenix District
Paul Tankersley	Safford District
Bill Grossi	Yuma District

Approved:



LYNN H. ENGDAHL
Acting Arizona State Director
May 1990

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Cover photo: *San Pedro River in the Safford District of Southeast Arizona, the first Riparian National Conservation Area.*

EXECUTIVE SUMMARY

The Arizona Riparian-Wetland Area Management Strategy is a blueprint describing how the Bureau of Land Management in Arizona will care for its riparian-wetland resources, consisting of some 42,930 acres of land associated with 1,408 miles of streams along with springs and meadows. (See map for major riparian-wetlands in Arizona.) More than just a plan to maintain and improve, it strives to reach out to other organizations and individuals to share goals and accomplishments and secure their assistance. Some 34 state and private entities in Arizona have active interests in the proper management and use of riparian areas. The forging of strong working relationships with the public will give broad support and the biggest return on investments and efforts.

BLM in Arizona has an active riparian-wetland management program. Perhaps the most significant accomplishment has been in the **acquisition** of over 100 miles of prime riparian habitat along the San Pedro River, Cienega, Aravaipa and Hot Springs Canyon creeks. Other accomplishments include **congressional designation** of the San Pedro Riparian National Conservation Area; **designation** of riparian areas as areas of critical environmental concern (ACECs); contributed funds and services by volunteer groups to specifically **enhance** riparian habitats on public lands; and **acquisition** of instream flow water rights. Ten applications are currently on file with the Arizona Department of Water Resources.

The Safford District recently received in 1988 the "Excellence in Riparian Habitat Management" award from the Western Section of the American Fisheries Society for riparian work on Bonita Creek.

While significant progress is being made, many riparian systems are in unsatisfactory condition. Both production and multiple-use values are presently well below site potential.

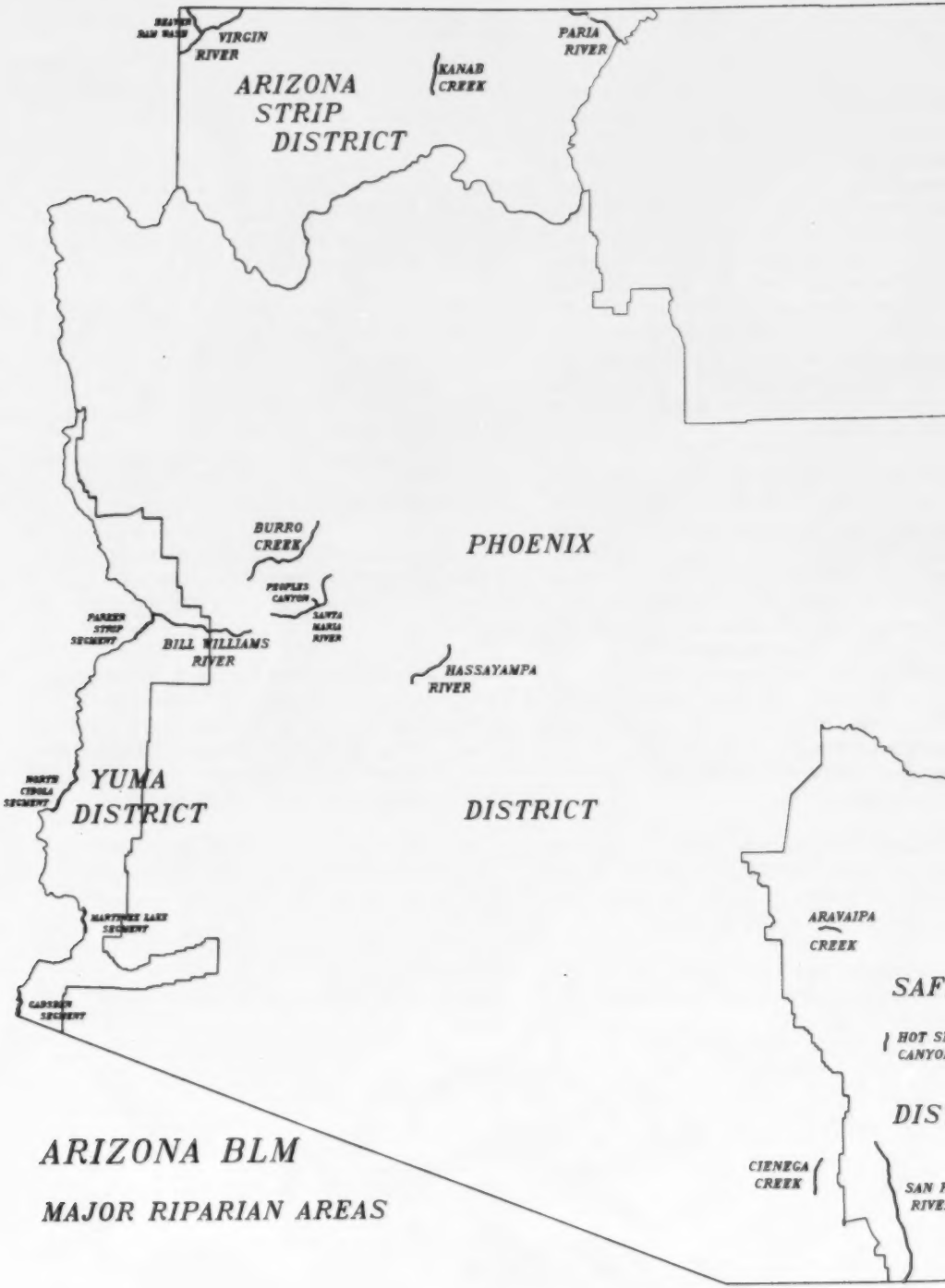
Specific goals and objectives have been incorporated into this strategy with the overall goal being to achieve a healthy and productive ecological condition of riparian-wetland areas for maximum long-term, multiple-use benefits and values.

Anticipated costs to fully implement the strategy over the 5-year period beginning in 1991 are $4.7 million. Costs of the five program features are inventory/classification $562,000; activity plan preparation/revision $714,000; project development/maintenance $2,323,700; monitoring $1,060,000; and development of an outreach program $55,000. If the entire amount is not funded, Arizona BLM will implement as much of this strategy as available funding will allow.

Implementation of this strategy will require an additional 19 permanent full-time positions such as wildlife biologists, range conservationists, engineers and hydrologists.

Benefits expected to be realized from this strategy include **restoration of perennial stream flows**; **improved water quality**; **aesthetics** and **recreational opportunities**; **improved fish** and **wildlife habitat**, along with **livestock management**; and generally **improved biological diversity** and **productivity**.

A supplement to this strategy is available upon request. It contains the Arizona Riparian Management Policy along with detailed proposals of the different program features. It also includes specific inventory and activity plans for preparation or revision, project development and maintenance proposals along with associated units, cost estimates, and fiscal year plans.


VIRGIN RIVER
KANAB CREEK
PARIA RIVER
ARIZONA STRIP DISTRICT
BURRO CREEK
PHOENIX
PEOPLES CANYON
SANTA MARIA RIVER
PARKER STRIP SEGMENT
BILL WILLIAMS RIVER
HASSAYAMPA RIVER
NORTH CIBOLA SEGMENT
YUMA DISTRICT
DISTRICT
MARTINEZ LAKE SEGMENT
CASTLE DOME SEGMENT
ARAVAIPA CREEK
SAF
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CANYO
DIS
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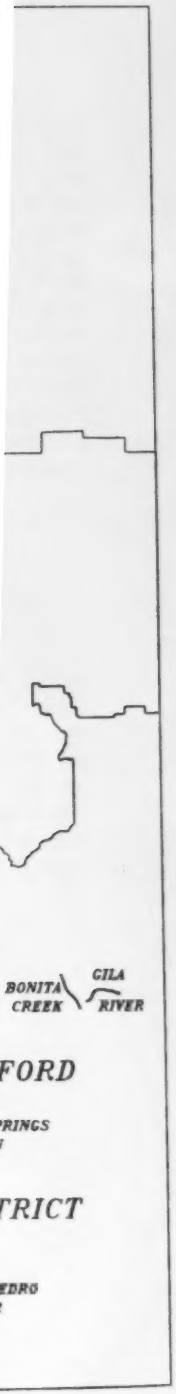
RIVE
ARIZONA BLM
MAJOR RIPARIAN AREAS



INTRODUCTION

A riparian area is land directly influenced by permanent water either on the surface or as free subsurface water within the rooting zone of dependent vegetation. A riparian area has vegetation or physical characteristics reflective of permanent water influence. Lake shores and stream banks are typical riparian areas. Excluded are such sites as ephemeral streams or washes which do not exhibit the presence of vegetation dependent upon free water in the soil. For purposes of this plan the terms riparian area and wetland area are synonymous.

It is the Bureau of Land Management's policy that all ongoing or proposed uses of the public lands are managed to ensure the protection of riparian areas. Every activity associated with the use or disturbance of these unique ecological sites must incorporate adequate management or restoration practices to ensure the long-term viability of riparian resources.

In July 1988, BLM in Arizona issued a formal policy that establishes specific goals and objectives for managing riparian-wetland areas (see Supplemental Information for details). This policy affirms BLM's strong commitment to properly manage riparian areas and also provides comprehensive guidelines.

The overall goal of riparian management in Arizona is to maintain, restore, or improve riparian areas to a healthy functioning condition thus achieving a healthy and productive ecological status for maximum long-term, multiple-use benefits and value.

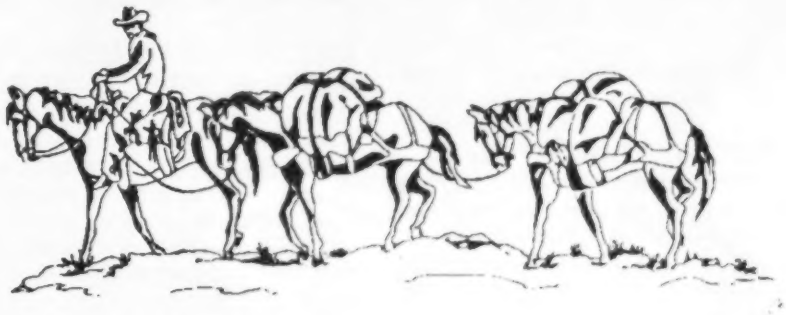
BLM has made significant progress in managing riparian areas on Arizona's public lands. However, many riparian systems are in unsatisfactory condition and function below optimum levels. Both produ and multiple-use values are presently well below potential.

Riparian areas comprise 42,930 acres of the p lands in Arizona. These riparian areas are scatt across the state in association with 1,408 miles of manent and intermittent streams, along with sp and meadows. While riparian sites make up o small percentage of the public land base, they pos a great diversity of biological resource values and agement potential.

Upland sites surrounding riparian zones in Desert Southwest are generally arid and semiarid ra lands where water is a critical limiting factor. consequence, many uses of the public lands are concentrated in riparian areas.

High public interest exists in proper riparian agement. There is a recognized need to better ma and improve this important component of the eco tem. Riparian area enhancement will be a pr resource management initiative on public lands in zona through the life of this plan and beyond.

Direction and policy for riparian managemen contained in the Taylor Grazing Act, the Federal Policy and Management Act of 1976, the Bure 1987 Riparian Area Management Policy, and the Arizona Riparian Area Management Policy. public laws and policies include the Public Rangel Improvement Act; the Emergency Wetland Resou Act; the Water Quality Act; and executive orders 11 for floodplain management, and 11990, for prote of wetlands.



STATE AND PRIVATE INTEREST IN RIPARIAN SYSTEMS

ARIZONA GOVERNOR'S OFFICE

Arizona's Governor issued an executive order in June 1989 directing (1) all state agencies to determine whether policies affect riparian resources and, if appropriate, to implement changes that will allow for restoration of riparian resources, and (2) the formation of a riparian task force from representatives of involved state agencies to inventory, classify, and coordinate with other agencies to make management and legislative recommendations. The task force reports to the Governor annually.

ARIZONA STATE LEGISLATURE

The 1989 session of the Arizona State Legislature considered a bill to create a State Riparian Protection Act. Other initiatives having riparian significance include native plant protection, interbasin water transfers, groundwater banking, and the Alamo Dam study by the U.S. Army Corps of Engineers and Arizona Department of Water Resources.

COMMISSION ON THE ARIZONA ENVIRONMENT

The Commission on the Arizona Environment has been actively drafting and lobbying for environmental legislation on riparian habitats. The Commission recently completed a 15-month assessment of many of the issues and controversies that affect the management and future of riparian habitats in Arizona and produced the "Riparian Resource Report."

ARIZONA RIPARIAN COUNCIL (ARC)

The Arizona Riparian Council was formed in 1986 to provide for the exchange and transmittal of information on the status, protection, and management of riparian systems in Arizona. The Council sponsors annual meetings where contributed technical papers are presented by agencies, academic institutions, environmental groups, and the interested public. In 1988, ARC's Classification and Inventory Committee distributed a final draft of their "Riparian Classification for Arizona" report hoping it would encourage statewide cooperation and coordination among land agencies and research organizations.

THE NATURE CONSERVANCY (TNC)

The Nature Conservancy in Arizona through its "Streams of Life" campaign, has raised funds to ensure the future of 19 significant natural areas in Arizona. TNC's primary objectives are to establish preserves to protect critical Arizona wetland habitats, assist state and federal agencies in cooperative projects to provide for long-term stewardship of major wetlands, promote the Public Land Protection Program, develop a Landowner Registry Program, and create greater public awareness of wetland values.

IZAAK WALTON LEAGUE (IWL)

In 1987, the Izaak Walton League of America entered into a letter of cooperation and coordination with federal agencies and environmental and public land user groups for improvement of riparian areas. Each year Riparian Enhancement Team projects are undertaken by the IWL to improve affected areas and provide useful models for review by others.

ARIZONA STATE PARKS

In 1988, the Arizona State Parks Board updated the State Comprehensive Outdoor Recreation Plan (SCORP) to include a Streams and Wetlands Advisory Core Group that considers the recreational and environmental value of the state's streams and wetlands. The "Arizona Rivers, Streams, and Wetlands Study" (or SCORP Report) was the result of this initiative.

ARIZONA GAME AND FISH DEPARTMENT (AGFD)

AGFD is responsible for managing the state's fisheries and wildlife resources. AGFD recently initiated and is coordinating an interagency effort to develop a uniform, statewide mapping and classification scheme for riparian resources in Arizona.

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY (ADEQ)

ADEQ is responsible for the planning, management, implementation, and compliance of state and federal water quality laws and water pollution control and abatement regulations by authority of the 1986 State of Arizona Water Quality Act and the Federal Clean Water Act Amendments of 1987.

ARIZONA DEPARTMENT OF WATER RESOURCES (ADWR)

In 1986, ADWR organized a task force to establish instream flow rules and to develop regulatory guidelines for processing applications for instream flow water rights. In addition, the ongoing adjudication of rights in the Gila and Little Colorado River Basin will establish the priority and extent of water uses including riparian-related uses on public lands.

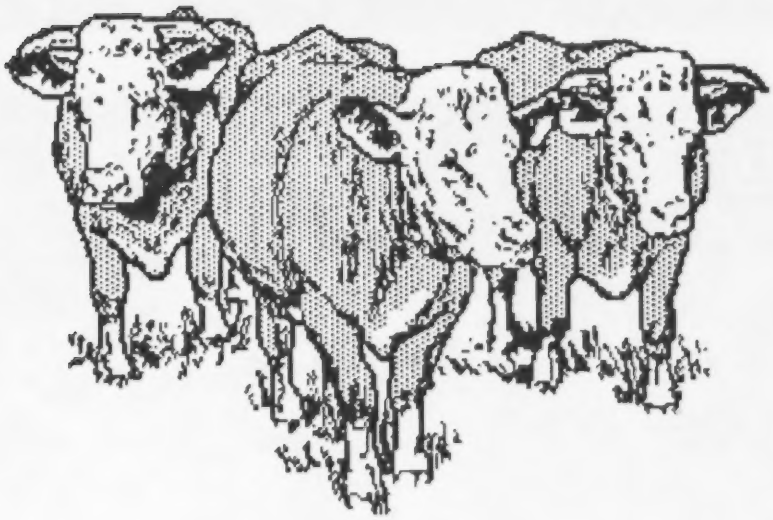
ARIZONA STATE UNIVERSITY (ASU)

The Center for Environmental Studies at ASU has extensively researched riparian systems in the Desert Southwest. Also, the Center is the primary sponsor of the Arizona Riparian Council.

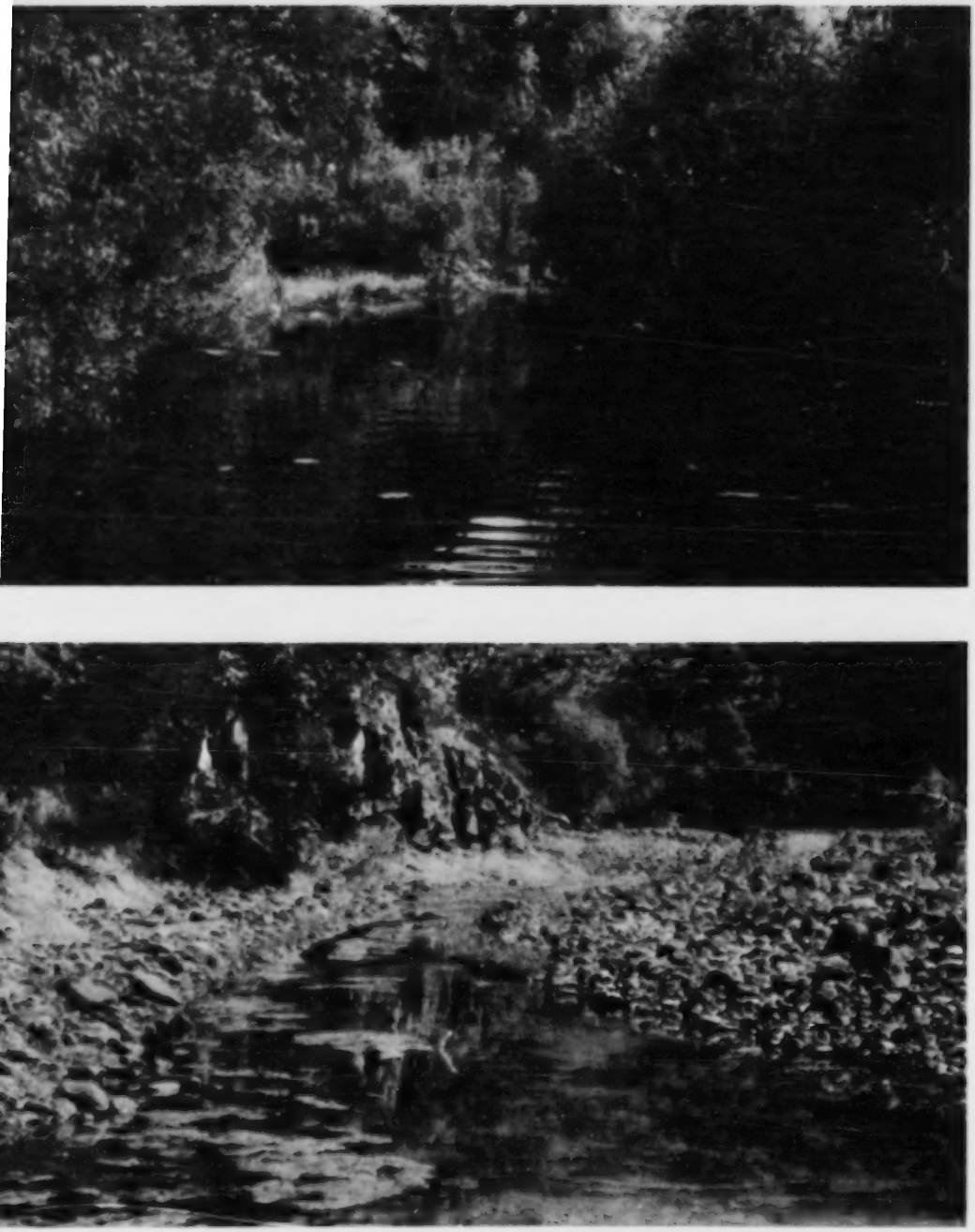
OTHER ORGANIZATIONS

Several other environmental and public land user groups have strong interests in Arizona riparian systems and their associated resource values and uses. They include American Fisheries Society, Defenders of Wildlife, The Wildlife Society, Friends of the San Pedro, National Parks and Conservation Association, Arizona Wildlife Federation, Sierra Club, American National Cattleman's Association, American Forestry Associatio Trout Unlimited, Tucson Rod and Gun Club, Arizon Desert Racing Association, Whitewater Explorer Northern Arizona Paddlers Club, Central Arizona Pa dlers Club, Audubon Society, Society for Range Ma agement, Society of American Foresters, Center f Holistic Resource Management, California Environment License Plate Program, Dixie Wildlife Federation, St dent Conservation Association, Future Farmers America and others.

Arizona BLM has been involved with these variou entities on a project planning and policy basis and ha developed strong ties with the riparian manageme community.

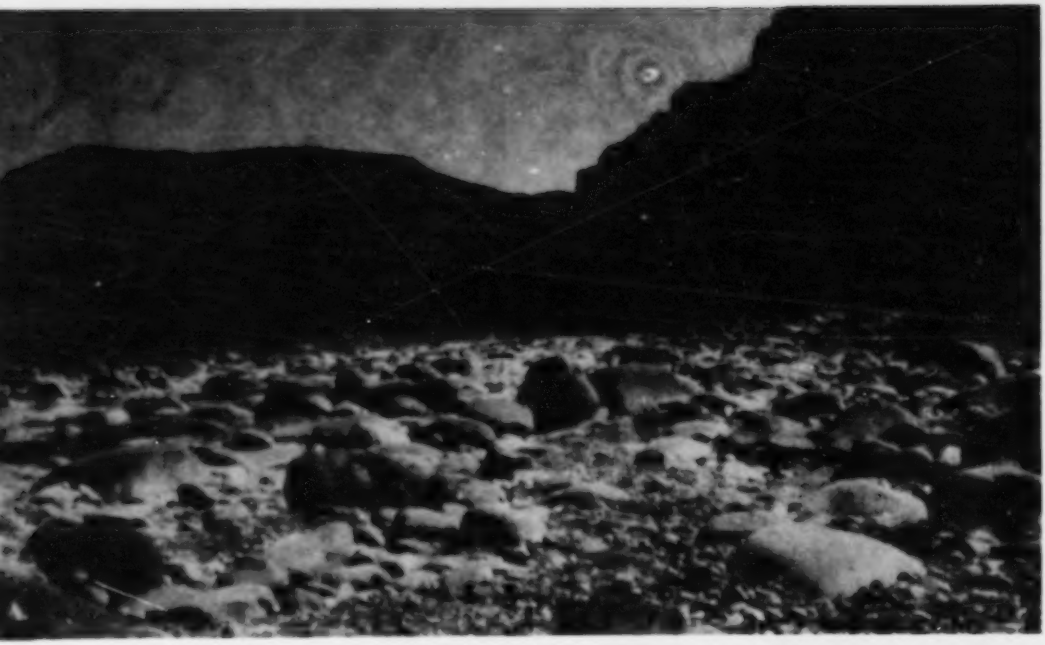


parian areas exhibit amazing resilience. Extensive flooding in **Aravaipa Canyon** removed all herbaceous



The Safford District's **Bonita Creek** in 1984 (top) shows the effects of a deteriorating watershed caused by
blems associated with mixed land ownership. The same creek in 1988 (bottom) exhibits the results of working
livestock owners, as well as land acquisitions, fencing, and contributions from volunteers in the form of tree

An aggressive land exchange program has enabled BLM to acquire prime riparian areas such as the **Empire/ Cienega** (top) and 44 miles of the **San Pedro River** (left). Proposed commercial development of these properties was averted by their conversion to public lands. Congress designated the San Pedro as the first Riparian National Conservation Area in November 1988.



A riparian management plan was implemented shortly after **Burro Creek** was scoured by heavy flooding i

EFFORTS AND AC

BLM in Arizona has made progress in riparian management in a number of ways. Perhaps the most noticeable gains have been the **acquisitions** of prime riparian habitats through the state and private land exchange program. Over 100 miles of mature, mixed broadleaf riparian and associated aquatic habitats have been consolidated under BLM management including four major waterways: the San Pedro River and the Cienega, Aravaipa and Hot Springs Canyon creeks.

Assistance from volunteers and other non-federal sources have enabled BLM to achieve several riparian goals. The Izaak Walton League's Riparian Enhancement Team, the California Environmental License Plate program, The Wildlife Society, Dixie Wildlife Federation, Student Conservation Association, Future Farmers of America, and Friends of the San Pedro River have contributed funds or services to specifically enhance riparian habitats on the public lands.

The BLM in Arizona also makes use of **special designations** to promote the cause of riparian management. Congress recently designated the BLM's San Pedro River as the first Riparian National Conservation Area. Burro Creek, Francis Creek, and People's Canyon have been designated by the State of Arizona as Unique Waters, giving them special water quality protection. Other areas considered for nomination include Bonita Creek, Hassayampa River, and Cienega Creek. The presence of high quality riparian zones was a factor in designating the Aravaipa Canyon Wilderness Area. Instream flow applications to preserve riparian habitats are pending for the Bill Williams and San Pedro rivers, Burro and Francis creeks, and other perennial streams on public lands. In March 1989 the Aravaipa Creek water right application was approved by the ADWR, making it the first instream flow permit issued to a land management agency in Arizona. Ten instream flow applications are on file with ADWR. BLM has conducted special studies on four of these streams to date.

BLM employees in Arizona have made **public presentations** about riparian accomplishments and program thrusts to schools, professional societies, and interest groups. Riparian accomplishments have been documented through slides, photographs, and monitoring studies.

The Safford District prepared a photographic display and narrative of their work on Bonita Creek for the Western Section of the American Fisheries Society

COMPLISHMENTS

contest entitled "Excellence in Riparian Habitat Management," in 1988. **The winning entry**, Bonita Creek, has become an excellent tool for the district's public affairs program.

District offices are encouraged to conduct riparian **workshops** or **seminars** in cooperation with the University of Arizona Cooperative Extension Service and other conservation organizations for the various land users and public interest groups.

The first BLM-sponsored **training course** on riparian management in Southwest ecosystems was held in St. George, Utah in October 1988. Some of the more significant accomplishments in riparian area improvement, protection, and management in recent years are listed below:

- **Planted** approximately **11,000 broadleaf trees** in several riparian areas;

- **Eliminated yearlong grazing** along several streams and rivers to **rest 50 miles** of riparian habitat;

- **Prepared** 15 allotment management **plans** and three habitat management **plans** containing riparian objectives;

- **Inventoried 463 miles** of riparian areas;

- **Collected data** to support the designation of five streams as unique Arizona waters;

- **Built 62 exclosures** to protect riparian features;

- **Built 36 miles of fencing** and **two pipelines** to improve livestock management and distribution along several streams;

- **Acquired instream flow rights** on Aravaipa Creek.

THE

This strategy builds on the previously illustra successes in Arizona, as well as the experiences other experts in the field of riparian management. C estimates used in the plan were developed by ea district office during January 1989, then refined more updated data became available. An estima $4.7 million is required over the next 5 fiscal years (to implement the five program features of the plan

TABLE 1
RIPARIAN MANAGEMENT NEEDS FOR ARIZO

STRATEGY FEATURES	COST
Inventory/Classification	$ 562,00
Activity Plan Preparation/Revision	$ 714,00
Project Development/Maintenance	$ 2,323,70
Monitoring	$ 1,060,00
Outreach	$ 55,00
TOTAL	$ 4,714,70

The success of this plan within the 5-year per from FY 1991 through 1995 depends largely on fu ing made available for riparian enhancement and m agement. Delays in implementation will result in creased costs due to the continuing degradation sites and would require additional recovery time. Fu ing will be distributed to each riparian area (Table 2) the priority value assigned through the inventory pr ess. The1988, Arizona Riparian-Wetland Area M agement Policy defines priority categories.

Beyond FY 1995, additional funding will be neec to continue project maintenance and monitoring forts, as well as additional activity planning and proj developments.

ESTIMATED RIPA

District	Miles
Arizona Strip	
Phoenix	
Safford	
Yuma	
TOTAL	

Acreages are estimat

STRATEGY

GOALS

1. Improve water quality to meet or exceed state water quality standards.

2. Increase productivity of riparian areas for water storage, vegetation productivity, biological diversity, bank stability, and fish and wildlife habitat.

3. Improve vegetation productivity on uplands adjacent to riparian areas to ensure satisfactory watershed conditions.

4. Monitor and evaluate management activities and their effects on riparian values. Revise management practices and/or modify enhancement projects where site-specific objectives are not being met.

5. Increase the use of volunteers in riparian enhancement projects.

6. Promote riparian management through coordination, cooperation, and consultation with all interested and involved parties.

7. Fully evaluate all proposed projects in riparian areas utilizing the interdisciplinary approach and public involvement for the management of riparian areas and identification of environmental impacts.

8. Fully implement this plan within 5 years emphasizing natural and unimpeded successional and stream function processes to achieve the following management objectives.

9. Ensure riparian area values are considered and protected from the impacts of road and pipeline construction, mineral exploration or development, recrea-

ABLE 2
IAN AREAS IN ARIZONA

f Streams	Riparian Acreage
78	2,300
300	21,250
340	8,100
190	11,280
308	42,930

d for streams, lakes, and marshes.

tion development, and forest and fire management practices.

OBJECTIVES

1. During FY 1991, develop an outreach program to encourage private individuals or groups, and state and federal agencies to work jointly to develop and implement riparian enhancement projects and improved management.

2. By 1995 inventory riparian areas, determine present conditions, and assign each area one of four priorities for management, as described in the Arizona Riparian Policy.

3. Improve water quality and riparian areas to a healthy functioning condition and good or better ecological status by 1997 on 75 percent of the BLM-administered streams by implementing grazing systems and strategically planned enhancement projects.

4. Develop or revise and implement activity plans affecting riparian areas and their resources to maintain, improve, or restore riparian ecosystems, and eliminate or mitigate resource use conflicts.

5. Monitor success or failure of important riparian characteristics to assess significant changes and trends in conditions.

6. Retain riparian areas and dependent uplands in public ownership and acquire new riparian areas where needed to ensure the integrity of public riparian ecosystems and their dependent resources.

7. Explore research opportunities in cooperation with university, federal or state researchers to identify riparian management strategies and techniques.

8. Identify critical or unique riparian areas that would benefit from special designation (i.e., Unique Waters, Riparian National Conservation Areas, Wild and Scenic Rivers, Areas of Critical Environmental Concern), through land use planning or other processes.

PROGRAM FEATURES

Opportunities for rehabilitating riparian systems are usually identified in land use plans. Rehabilitation can often be accomplished through proper livestock management and riparian enhancement projects. The proper management of adjacent uplands is critical to the success of riparian management.

This plan consists of five components: inventory/classification, activity plan preparation/revision, project development/maintenance, monitoring, and outreach programs. Once this plan begins, all components will be carried out concurrently, with monitoring continuing indefinitely.

INVENTORY/CLASSIFICATION ($562,000; 1,120 MILES; 34,700 ACRES)

The Inventory/Classification phase will include descriptions of each riparian area to provide information essential to the management and improvement of these areas and baseline information for establishing and monitoring management objectives and for preparing management plans. This information will identify areas and their riparian characteristics; estimate the composition and structure of the vegetation; determine the apparent site condition and potential; identify riparian area values and conflicting uses, as well as the management needs and opportunities.

TABLE 3
INVENTORY/CLASSIFICATION

District	Fiscal Year	Estimated Costs	Estimated Miles	Estimate Acres
Arizona Strip	1991	*$43,000	37	1,150
	1992	23,000	41	1,150
	1993	0	0	0
	1994	0	0	0
	1995	0	0	0
DISTRICT TOTAL		$66,000	78	2,300
Phoenix	1991	80,000	159	4,000
	1992	80,000	189	4,700
	1993	80,000	184	4,600
	1994	0	0	0
	1995	0	0	0
DISTRICT TOTAL		$240,000	532	13,300
Safford	1991	**58,000	42	2,440
	1992	36,000	62	875
	1993	20,000	94	1,164
	1994	35,000	70	2,391
	1995	10,000	52	950
DISTRICT TOTAL		$159,000	320	7,820
Yuma	1991	52,000	54	4,450
	1992	20,000	66	2,970
	1993	25,000	70	3,860
	1994	0	0	0
	1995	0	0	0
DISTRICT TOTAL		$97,000	190	11,280
Arizona Total	1991	233,000	292	12,040
	1992	159,000	358	9,695
	1993	125,000	348	9,624
	1994	35,000	70	2,391
	1995	10,000	52	950
GRAND TOTAL		$562,000	1,120	34,700

The mileages and acreages differ from those in Table 2 because inventories have been completed i
areas and in others, riparian status is unknown. These will be refined as inventories are completed.

The BLM in Arizona is cooperating in the development of a statewide interagency riparian classification system. If adopted it would provide a uniform list of attributes and much of the baseline resource information for each riparian area within the state. In addition, BLM has issued a statewide inventory and monitoring handbook for use by resource specialists to assess riparian area conditions. To the extent possible, riparian inventory/classification will be conducted in conjunction with an Ecological Site Inventory or the Integrated Habitat Inventory and Classification System. Management priorities will be assigned based on inventory and classification data.

ACTIVITY PLAN PREPARATION/ REVISION ($714,000; 104 PLANS)

Activity plans provide specific management single resource program or element, undertaken t plement general land use plan decisions.

The Activity Plan Preparation/Revision phas consist primarily of the development or revision of ment management plans and habitat management to incorporate the major land use plan objectives

TABLE 4
ACTIVITY PLAN PREPARATION/REVISION

District	Fiscal Year	Costs	Plans
Arizona Strip	1991	$12,000	3
	1992	12,000	4
	1993	24,000	8
	1994	21,000	7
	1995	24,000	7
DISTRICT TOTAL		$93,000	29
Phoenix	1991	21,000	3
	1992	24,000	4
	1993	24,000	4
	1994	24,000	4
	1995	27,000	5
DISTRICT TOTAL		$120,000	20
Safford	1991	126,000	11
	1992	90,000	10
	1993	102,000	10
	1994	90,000	9
	1995	69,000	8
DISTRICT TOTAL		$477,000	48
Yuma	1991	9,000	3
	1992	3,000	1
	1993	3,000	1
	1994	3,000	1
	1995	6,000	1
DISTRICT TOTAL		$24,000	7
Arizona Total	1991	168,000	20
	1992	129,000	19
	1993	153,000	23
	1994	138,000	21
	1995	126,000	21
GRAND TOTAL		$714,000	104

cerning riparian management. These plans will require analysis of the specific needs of each riparian area and associated uplands, as well as preparation of site-specific environmental analyses (EAs) of proposed actions. Further, it will identify opportunities for coordination and cooperation from involved permittees, state and federal agencies, and various affected interest groups.

As previously mentioned, the associated uplands must be included in this strategy for riparian enhancement. They directly influence the riparian corridor by regulating the surface and subsurface flows, thus influencing sediment yield to the riparian system and recharging of groundwater aquifers. Since the hydrologic cycle consists of the local and regional climate, geologic structure, and soils, a healthy watershed will likely have a stabilizing impact on the shape, character, and structure of the riparian zone.

PROJECT DEVELOPMENT/ MAINTENANCE ($2,032,700 FOR NEW PROJECTS; $291,000 PROJECT MAINTENANCE)

During this phase, projects will be carried out to improve and maintain riparian areas. Detention structures may be developed to spread the flow, dissipate water energy, and allow sediment to deposit. Cottonwood, willow, and other native species will be planted to stabilize banks, diversify vegetation, and provide new wildlife and fishery habitat. Proper management will allow riparian plants to replace terrestrial plan through restoration of the water table. Projec implen entation will be used to supplement ecosystem reco ery only when and where management actions in ar of themselves will not meet site-specific objectives in reasonable amount of time.

Fencing projects will be needed to protect re sources, implement grazing systems and control live stock distribution in both riparian areas and associate uplands. In some cases additional water sources awa from streambeds may need to be developed for live stock. Vegetation on upland sites may need to b manipulated to remove invader species and improv upland conditions, thereby relieving pressure on ripa ian zones. Some areas may need to be seeded t establish preferred species. Specific projects will b identified and prioritized as activity plans are com pleted. Annual project maintenance would be pe formed by BLM, permittees, or volunteers.

The project design portion of this phase will includ determination of material needs, contracting require ments as appropriate, and site-specific engineerin design work. This will further identify workforce need and opportunities for the use of volunteers in proje construction work.

Project development and maintenance cost est mates (Tables 5 and 6) represent the best data avai able under present constraints. Estimates will b refined as inventory and activity plans are complete

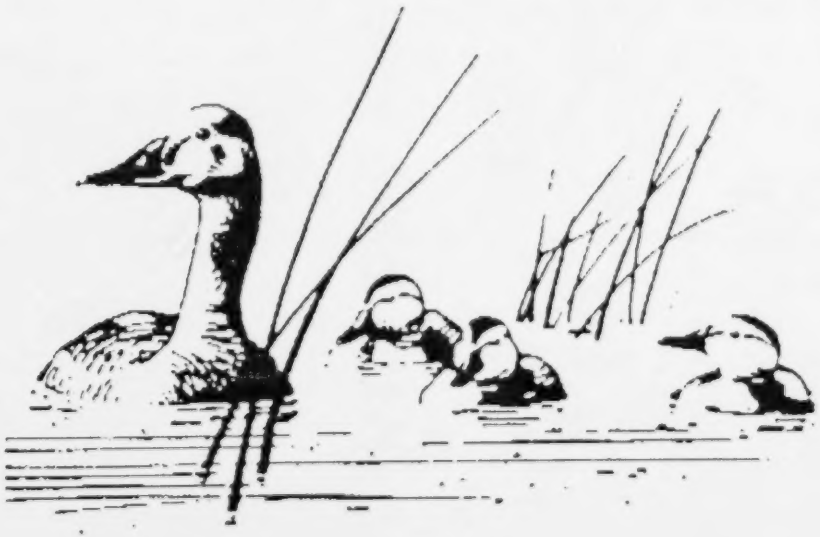


TABLE 5
PROJECT DEVELOPMENT/MAINTENANCE

	Fiscal Year	Estimated Development and Construction Costs	Estimated Annual Maintenance Costs
	1991	$15,800	$8,000
	1992	29,000	5,000
	1993	51,000	6,000
	1994	37,000	7,000
	1995	42,000	8,000
TAL		$174,800	$34,000
	1991	80,000	10,000
	1992	80,000	10,000
	1993	80,000	10,000
	1994	80,000	20,000
	1995	80,000	20,000
TAL		$400,000	$70,000
	1991	241,000	20,500
	1992	297,000	25,000
	1993	171,000	25,000
	1994	210,500	25,000
	1995	274,500	25,000
TAL		$1,194,000	$120,500
	1991	3,500	4,000
	1992	32,400	35,000
	1993	82,000	4,000
	1994	56,000	9,000
	1995	90,000	14,500
TAL		$263,900	$66,500
	1991	340,300	42,500
	1992	438,400	75,000
	1993	384,000	45,000
	1994	383,500	61,000
	1995	486,500	67,500
L		$2,032,700	$291,000

MONITORING ($1,060,000; 119 PLANS)

A coordinated, interdisciplinary monitoring program will be established in cooperation with affected interests to measure the effectiveness of the activity plans, riparian enhancement projects, and associated grazing systems in the accomplishment of the long-term goals and objectives of this plan. The monitoring of riparian areas and associated uplands will vary depending on the degree of complexity of the ecological site and the priority placed upon the management of any given riparian area. Monitoring results will be utilized to update activity plans in subsequent years.

Monitoring techniques include photo points established to document changes in vegetation communities and channel morphology; low-level aerial, color infrared photography to document the composition and extent of riparian areas and change over time; transects to document changes in stream morphology, vegetation species composition and diversity, changes in the widths of riparian areas; and utilization of key species by livestock and wildlife. Monitoring will also document age class and composition of the riparian area tree species including seedlings, saplings, poles, and mature trees.

TABLE 6
MONITORING

District	Fiscal Year	Costs $	Plans (Cumulative)
Arizona Strip	1991	$10,000	4
	1992	20,000	8
	1993	40,000	16
	1994	57,000	23
	1995	77,000	31
DISTRICT TOTAL		$204,000	31
Phoenix	1991	9,000	3
	1992	18,000	6
	1993	*36,000	10
	1994	*48,000	14
	1995	*60,000	18
DISTRICT TOTAL		$171,000	18
Safford	1991	58,000	23
	1992	105,000	42
	1993	120,000	48
	1994	142,000	57
	1995	158,000	63
DISTRICT TOTAL		$583,000	63
Yuma	1991	6,000	3
	1992	18,000	4
	1993	21,000	5
	1994	27,000	6
	1995	30,000	7
DISTRICT TOTAL		$102,000	7
Arizona Total	1991	83,000	33
	1992	161,000	60
	1993	217,000	79
	1994	274,000	100
	1995	325,000	119
GRAND TOTAL		$1,060,000	119

* Includes two workmonths ($3,000/wm) for Phase II of riparian area condition evaluation inventory.

OUTREACH PROGRAMS ($55,000)

An outreach effort is an integral part of the management strategy for ensuring the success of Arizona's riparian restoration and protection efforts. Arizona BLM will develop an outreach plan and provide information to state agencies and special interest group.

One product will be a video demonstrating successful riparian management or improvement techniques. The video will then be used as an integral part of regional riparian management training. Each district will nominate areas that show successful riparian improvement/management for consideration. A team of state/district office members can then select candidate areas and work with the districts and Phoenix Training Center to produce the video.

Because public information, education, and involvement are critical to successful riparian resource management, district offices will also prepare products for use in public affairs and riparian seminars at the district level.

BLM sponsored workshops will be developed and presented to the citizens of Arizona including school children, livestock interests and conservation groups. The intent of the workshops will be to educate the public and to gain their support for Bureau riparian management efforts.

PERSONNEL NEEDS

Additional personnel need to carry out the various phases of this strategy are identified inTable 7.

Funding requirements for these positions was estimated at $3,000 per workmonth. As this strategy plan is implemented, additional personnel would be hired in response to increasing workloads. Hiring would be phased over the term of the strategy plan and completed by 1995. In addition to the positions shown, seasonal employees would be needed to conduct inventory, classification, project planning work and monitoring.

A training plan will be developed to assure that all new employees receive training to develop the technical expertise necessary for complex decision making involving riparian area management.

TABLE 7
PERMANENT FULL-TIME PERSONNEL NEEDS

	Arizona Strip	Phoenix	Safford	Yuma
Engineer/Eng Tech.	-	1	-	1
Fisheries Biologist	-	-	1	-
Wildlife Biologist	1	1	-	-
Wildlife Technician	-	2	-	2
Hydrologist/Soil Sci.	-	1	1	1
Range Conservationist	1	1	1	-
Range Technician	-	-	1	-
Natural Rec. Spec.	-	-	2	1
TOTAL (19PFT)	**2**	**6**	**6**	**5**

REALIZED BENEFITS

Implementation of this plan will demonstrably improve water quality as the natural processes of riparian systems are restored or enhanced. Effective riparian systems slow the flow of water, allowing it to soak into the soil and recharge the water table. As groundwater storage is enhanced, intermittent streams will, in many cases, maintain perennial flows. Riparian vegetation along upper watershed streams can absorb and dissipate the energy of floodwaters, reducing downstream damage. Plant roots bind and hold settled soils in place while stems and foliage filter and settle sediments, resulting in the building and protection of stream banks. Proper riparian management techniques also reduce sedimentation in reservoirs, extending their effective life and improving water quality. These techniques are also effective in controlling non-point source pollution.

Restoration of perennial streamflow will make water available to livestock and wildlife during the normally dry summer months, thus reducing the need for expensive water developments.

Many wildlife species depend upon the unique and diverse habitat niches offered by riparian areas. This habitat provides food, water, shade, and cover- -valuable necessities for wildlife and livestock. Riparian vegetation is of critical importance to fish. It provides escape cover, lowers summer water temperatures through shading, and reduces stream bank erosion that can silt in spawning and rearing areas. The potential for fisheries habitat improvement is significant.

Riparian area enhancement will increase opportunities for a variety of general recreational uses such as camping, hiking, bird watching, photography, and relaxation. Other popular uses are fishing, and hunting upland game, waterfowl, and big game.

The improved biological diversity and productivity resulting from implementation of this plan will significantly add to the multiple resource values of public lands in Arizona.